MARINE REVIEW.

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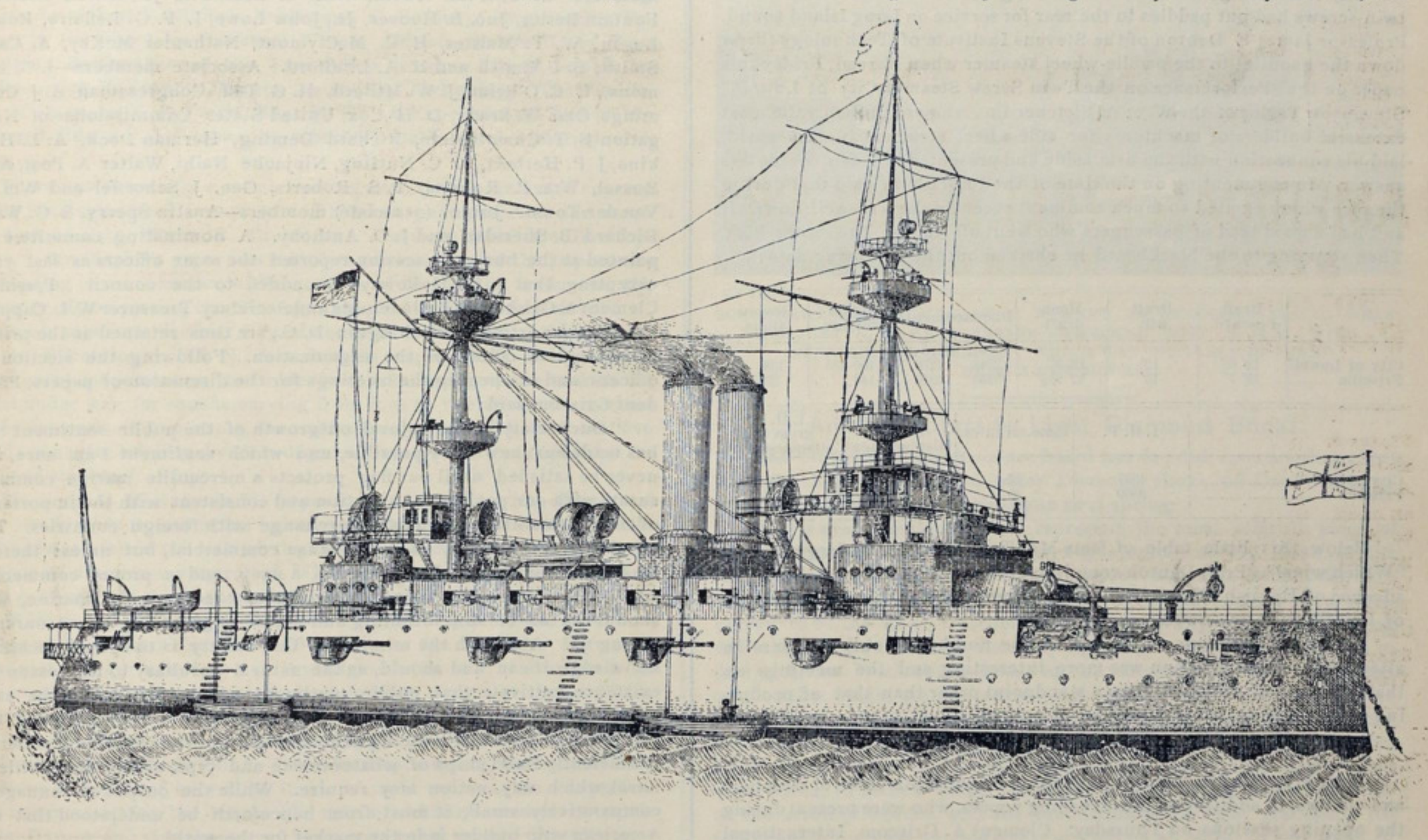
Biggest Battleship Afloat.

The British battleship Majestic, illustrated on this page, has a displacement of 14,900 tons, exceeding that of any battleship afloat. This vessel with the Magnificent, a duplicate ship, are the forerunners of nine of the same class. The length of the Majestic between perpendiculars is only 390 feet, but, including the massive ram bow, which projects to a distance of 15 feet, and the hang-over of the stern and gallery, the total length over all is about 430 feet. The beam is similar to that of the Royal Sovereign class—75 feet. Hence the increased length has improved the speed of the new vessels, 17.8 knots per hour having been obtained with the Majestic, although the indicated horse power is actually 1,000 less than in the battleships of the 1889 programme. On a thirty hours' continuous trial, steaming gently, without any break, at an average rate of horse power of 6,075, the Majestic covered 440 knots in thirty hours; while, for every indicated unit of horse power, she consumed only 1.84 pounds of coal per hour.

The big battleship is sheathed with 9-inch Harveyed steel plates for a depth of 16 feet along the sides, the armor extending from apex to apex of a pointed citadel, the length from end to end being about 300 feet. The main armament consists of four 12-inch wire guns, two in each barbette, the breech and body of the gun being protected with a steel hood, having an extreme thickness of 10 inches in front. In addition there are twelve 6-inch quick fire guns and sixteen 12-pounder quick-fire guns. The illustration is from the Engineer of Londou.



BRITISH BATTLESHIP MAJESTIC—LARGEST VESSEL OF HER KIND IN THE WORLD.

BRITISH BATTLESHIP MAJESTIC—LARGEST VESSEL OF HER KIND IN THE WORLD.

Iron Ore Shipments—Lake Freights.

Official reports to ore sales agents in Cleveland place the shipments by water from all upper lake ports up to Nov. 1 at 9,346,741 gross tons, against 7,046,928 tons up to the same date in 1894, or a gain thus far this season of 2,299,813 tons. The gain during November was principally from Escanaba, where shipments are considerably above 2,000,000. The season's shipments by water from all ports will exceed 9,500,000 tons, and with some all-rail shipments the entire output of the year will be well up towards the ten-million mark.

At this writing, however, the ore business of 1895 is nearing the end—so much so that on the few cargoes that are yet to come down rates are liable to be reduced instead of being marked up, as is usually the case at the close. The Escanaba rate, which dropped to $1.10 a few days ago, is not very strong at that figure and there are probably less than a dozen "wild" cargoes yet to come from the head of the lakes, but few vessels are seeking loads in that direction and there has as yet been no decline in the $2 rate.

Secretary Herbert has upheld Chief Naval Constructor Hichborn in his contention that no further penalties should be imposed upon ship builders. This is the result of the consideration of this matter by the board of bureau chiefs of the navy department. Capt. Sampson wishes to fine them when they fail to furnish plans to armor manufacturers within a specified time, and Engr.-in-Chief Melville for overweight in hull construction. The chief constructor urged that ship builders were now under three penalities—one for delay in completion, one for deficiency in speed and one for overweight of machinery. The department had deprived the ship builder of the incentive formerly held out, of a bonus for excess speed, and if new penalties were now provided for, he very sensibly concludes that it will be difficult to secure bids and would tend to discourage the ship building industry. Secretary Herbert, after considering the matter, finally rejected the propositions of the board.—Army and Navy Journal.

Shipments of ore from Ashland up to and including Nov. 5, aggregated 2,273,267 gross tons, of which 1,092,279 tons was from Gogebic range mines on the Wisconsin Central Railway and 1,180,988 tons from mines on the Northwestern. There was also shipped through Escanaba up to Nov. 5, 106,100 gross tons of ore from the Windsor, Palms and Norrie mines on the Gogebic, making the total movement of ore from the range 2,379,367 gross tons. Shipments over the northwestern road up to the date named were divided as follows: Anvil 61,593 gross tons, Brotherton 34,904, East and West Cary 51,623, Eureka 26,782, Davis 9,557, Norrie 520,632, Norrie group through Escanaba, 85,000, East Norrie 74,511, Pabst 194,472, Mikado 2,426, Palms, 26,240, Palms through Escanaba 7,100, Newport 157,882, Sunday Lake 14,309, Windsor 5,457, Windsor through Escanaba, 14,000.

An error was made in the last issue of the REVIEW in reporting the present rate of wages for chief engineers on first-ctass steamers at $100 a month. The rate is $110.

NAVAL ARCHITECTS.

THIRD ANNUAL MEETING OF THE SOCIETY IN NEW YORK.—NAVAL MEN PREDOMINATE.—MOST OF THE PAPERS AND DISCUSSION HIGHLY TECHNICAL.

(*Editorial correspondence.*)

New York, N. Y., Nov. 9.—The third annual meeting of the Society of Naval Architects and Marine Engineers, which closed last evening with a banquet at the Brunswick, was declared a success by the men of the navy who were in attendance, but as compared with the meeting of a year ago, there was a noticeable absence of builders of merchant ships and others interested in shipping affairs generally. It would seem that something should be done in the society to maintain an interest in these meetings for members of the society other than those who are now or have been naval officers. Members were slow in reaching the rooms of the American Society of Mechanical Engineers, No. 12 Thirty-first street, where the meetings were held, and at the opening session it looked as if the gathering would be an affair of the naval architects. Interest warmed up somewhat later on, but the papers were as a rule highly technical and they did not bring out spirited discussion, nothwithstanding the fact that the first paper was calculated to inspire merchant ship builders to look to South America for orders and to prepare for a fair share of the world's commerce as soon as the Nicaragua canal was opened. But for Admiral Meade and his criticisms the first day would have been dry.

One interesting feature of the meeting was the effort to show that twin-screws had put paddles to the rear for service on Long Island sound. Professor James E. Denton of the Stevens Institute of Technology threw down the gauntlet to the paddle-wheel steamer when he read, Friday, his paper on the "Performance on the Twin Screw Steamer City of Lowell." Stevenson Taylor of the W. & A. Fletcher Co., who are probably the most extensive builders of machinery for side-wheel steamers in the world, laid his connection with the firm aside and presented in a few words his answer. In commenting on the time of the Priscilla he said that during the race which excited so much comment recently she was well down aft and had a good load of passengers who went aft to see the other boat. Then stepping to the blackboard he chalked out the following data:

	Draft forward.	Draft aft.	Mean draft.	Displacement		Steam pressure.	Revolutions.
				Net.	Gross.		
City of Lowell	12′ 6″	12′	12′ 3″	2543	2270	160-155	136
Priscilla	12′ 7″	13′	12′ 9½″	5333	4940	140	23.56

	I. H. P.	Time, minutes.	I. H. P., net ton displacement.	I. H. P., gross ton displacement.
City of Lowell	4347	47	1 709	1.901
Priscilla	8500	46	1.536	1.726

Below this little table of facts Mr. Taylor wrote in large letters "Which wins?" Prof. Denton complimented the Fletchers on being in advance of English efficiency and drew attention to the fact that the City of Lowell had new screws.

On Friday there was an increase in the number of ship builders in attendance; the discussion was more interesting and the meetings on that day more of a success from a standpoint other than that of producing a large amount of technical naval matter.

THOSE WHO WERE PRESENT.

Following is a list, which is thought to be quite complete, of members and visitors, in addition to those reading papers, who were present during the opening sessions on Thursday: Clement A. Griscom, International Navigation Co.; W. L. Capps, U. S. N.; Chief Engineer Charles H. Loring, U. S. N, retired; Rear Admiral Richard Meade, U. S. N., retired; Naval Constructor Francis T. Bowles, U. S. N.; Thomas W. Hyde, Bath Iron Works; Chief Engineer John C. Kafer, U. S. N., retired; Frank B. King, Maryland Steel Works; Jacob W. Miller, U. S. N.; Lewis Nixon, Elizabethport, N. J.; Harrington Putnam, Horace See, N. A., E. Platt Stratton; Stevenson Taylor of the W. & A. Fletcher Co.; George E. Weed, Naval Constructor T. D. Wilson, U. S. N., William H. Webb, Naval Constructor T. W. Hibbs, U. S N., H. B. Roelker, N. A.; Prof. W. F. Durand of Cornell University; H. Jonson of Jonson Engineering Works; Capt. Norton of the Marine Journal; William Kent of the Engineering News; C. W. Whitney, representing the Serve ribbed tube and Purved furnace; W. W. Bates, author of American Marine; George P. Wilson, Columbian Metallic Packing Co.

Quite prominent in the meeting was Miers Coryell, who has just returned from England, where he holds the position of advisory engineer to the admiralty. He is retained in connection with the adoption of the Belleville boiler in the British navy. Several well-known manufacturers of water tube boilers were present, among them William Ward of Charleston, W. Va.; E. E. Roberts, New York; D. Almy, Providence, R. I., and C. D. Mosher, New York. F. M. Wheeler of the George F. Blake Manufacturing Co. was an interested spectator.

At the Friday morning session there were noticed among the new arrivals W. C. Williamson of Williamson Bros., Philadelphia; H. Kanitzky of Neafie & Levy and Mr. Hillman of the Hillman Ship and Engine Building Co. Others arriving later were: Howard Pusey, American Line, Philadelphia; Charles B. Seabury, H. W. Johns Co.; William W. Varney, mechanical attorney at-law, Baltimore; J. H. Dialogue, ship builder, Camden, N. J.; Prof. Peabody, Massachusetts Institute of Technology; F. B. Stevens, Hoboken Ferry Co., and Konstantin Jausson, professor of naval architecture, Webb's academy.

Among those who visited the sessions and were in very material evidence at the banquet were Commodore Sicard, U. S. N., J. F. Holloway, C E. Emery, Charles T. Gause, H. Taylor Emery, W. H. Bailey, U. S. N., Wm Gardner, Irving Cox, H. A. McGuire, Wm. Rowland, J A. Kafer, U. S. N., Richard W. Meade, Jr., John Loyd, A. R. Smith, W. F Leonard, D. Lubin, Mr. DuBosque, T. J. Shaw, R. Deming, Warren E. Hill, Thomas B. Rowland, C. B. Rowland, T. B. Rowland, Jr., and Congressman A. Cummings. Naval Constructors Woodward, Capps, Taylor, Bowles, Gillmore and Zohm were grouped together at the banquet.

CONDITION OF THE SOCIETY.

The condition of the society is very prosperous, as was shown by the report of Secretary-Treasurer W. L. Capps. There is in the bank to the society's credit $5 925 and the membership of 470 has been increased to 508 by the election of the following members, associates, and juniors: Members—L. C. E M. Aubin, Wm. C. Besselrin, Jr., Alfred Dietrich, Fontain Berier, Jno. B. Hoover, Jr., John Lowe, L. F. G. Leflaire, Robert Logan, W. T. Malster, E. C. McClymont, Nathaniel McKay, A. Carey Smith, S. U. Smith and H A. Lindford. Associate members—J. G. Emmons, E C. O'Brien, J. W. Millard, H. G. Taff, Congressman A. J. Cummings, Geo. W. Brady, D. H Cox, United States Commissioner of Navigation E. T. Chamberlain, Richard Deming, Herman Dock, A. L. Hopkins, J P. Herbert, D C. Nutting, Ninjaohe Naihi, Walter A. Post, A. S. Rossel, Wm. P. Roberts, T. S Roberts, Geo. J. Schoeffel and Wm. H. Van der Toom. Junior (associate) members—Austin Sperry, S. G. Ward, Richard B. Sheridan and J. O. Anthony. A nominating committee appointed at the business session reported the same officers as last year, excepting that J. F. Holloway was added to the council. President Clement A. Griscom of Philadelphia and Secretary-Treasurer W. L. Capps of the navy department, Washington, D. C., are thus retained as the principal executive officers of the organization. Following the election of officers, and in opening the meetings for the discussion of papers, President Griscom said:

"Our society is the natural outgrowth of the public sentiment that has made our new navy possible, and which sentiment I am sure, will never be satisfied until our flag protects a mercantile marine commensurate with our position as a nation and consistent with the importance of the commodities we must interchange with foreign countries. The mission of this society is in no sense commercial, but unless there is a national sentiment that demands a navy, and a proper commercial spirit in the land that demands an adequate commercial marine, why should the art of ship building and naval engineering be encouraged among us? Although the mission of this society is to spread technical knowledge, it can and should, as the natural corollary to its reason for existence, cultivate that public sentiment which shall make the art a public necessity. The product of American ship building during the last year has been a convincing demonstration of the capacity of America to efficiently build ships of whatever size and type, either mercantile or naval, which any nation may require. While the output of tonnage is comparatively small, it must from henceforth be understood that the American ship builder is in the market for the world.

"The industry of ship building for certain kinds of traffic has made great strides upon the lakes, and it is with regret that we note the existence of a treaty which prevents the ship builders of the lake region from taking part in the benefits to the trade which arises from building for the navy. It is also apparent that there is a turning point approaching in the character of the coasting trader, when a company lays down a 5,000-ton steamer with quadruple expansion engines and water tube boilers, such as that commenced at Newport News."

A pleasant feature of the business session was the election of the veteran ship builder W. H. Webb to honorary membership. He was present and responded in a grateful acceptance of the honor. Lord Brassey of the British Society of Naval Architects was made an associate honorary member.

One other matter aside from the papers was taken up by the society. It was proposed to present a memorial to congress asking favorable action on the Nicaragua canal project under the auspices of an American company, but the proposition was defeated, although a committee of which Admiral Meade was chairman reported in favor of the president addressing such a memorial to congress if the report of the Nicaragua canal commission, when made public, is found to be favorable to the

canal. Opposition was led by Chas. H. Loring, ex-engineer-in-chief of navy, and was based on the very good argument that the society could not afford to take part in matters of this kind which are intended to influence legislation.

LIST OF PAPERS—NOTES REGARDING THEM.

On Thursday six papers were read and only one of them, that presented by Assistant Naval Constructor Elliot Snow, had to be read by the secretary. These six papers were: American Maritime Development, by Capt. Henry C. Taylor, U. S. N., president Naval War College; Rudder Experiments—U. S. S. Monterey, by Elliot Snow, assistant naval constructor, U. S. navy; The Centerboard,—its influence on design, its value and its proper use, by Wm. P. Stephens, Esq; Aluminum,—its alloys and their use in ship construction, by J. C. McGuire, Esq., C. E; Methods and Forms of Certain Ship Calculations, by D. W. Taylor, naval constructor, U. S. Navy; Number of Longitudinal Intervals in Ship Computation, as Effecting the Accuracy of Integration for Displacement, and Note on the Relation Between Reduced and True Wetted Surface, by Prof. W. F. Durand, Cornell University.

At Friday's sessions the secretary was called upon to read two papers, those of Chief Naval Constructor Hichborn and Mr. F. B. Dowst, neither of whom were present. Naval Constructor A. W. Stahl was also unable to attend the meeting and his paper, which was the last on the programme, was read by title only. Friday's list of papers was as follows: Recent Designs of Vessels for the U. S. Navy, by Philip Hichborn, chief constructor, U. S. Navy; Tactical Consideration Involved in War Ship Design, by Albert P. Niblack, lieutenant, U. S. Navy; Engineering Research in the Navy, by Professor Wm. S. Aldrich, University of West Virginia; Performance of the Twin-Screw Steamer City of Lowell, by Professor Jas. E. Denton, Stevens Institute of Technology; The Ventilation of Ships, by F. B. Dowst, Esq., M. E.; An Experimental Test of the Armored Side of U. S. S. Iowa, by Albert W. Stahl, naval constructor, U. S. Navy.

There was seemingly a connection between the movement in support of the Nicaragua canal company and the first paper read at the meeting, that of Capt. Henry C. Taylor on "American Maritime Development." Mr. Taylor's paper was mainly a presentation of the importance of securing to our commerce the control of the Pacific trade and the necessity of completing the Nicaragua canal with this end in view.

In his paper on "Rudder Experiments, U. S. Monterey," Asst. Naval Constr. Elliot Snow, U. S N., describes his experiments to determine the twisting movement on the rudder head when using the helm with the vessel under way, for speeds varying from four to twelve knots, increasing by intervals of two knots, the rudder being set at each of these five speeds at angles varying by few degrees, intervals from amidships to hard and starboard and port.

Mr. James C. McGuire in his paper on "Aluminum: Its Alloys and their Use in Ship Construction" gives a table showing some of the tests of the plates used in the hull of the Defender, one of which is the largest plate of aluminum ever rolled, 38½ inches wide by 13 feet 10 inches long, $\frac{5}{16}$ of an inch thick, and weighing 200 pounds. Its tensile strength was 40,780 pound, its elongation 10 per cent. in 2 inches and the reduction of area at the point of fracture 14.75 per cent. Mr. McGuire expressed his regret that our navy has not investigated the use of aluminum in ship construction as extensively as have foreign navies, its possibilities in ship construction being very great.

In the paper by Naval Constructor Taylor on "Methods and Forms for Certain Ship Calculations,"—those for displacement, water-line areas, positions of center of buoyancy, locus of meta centers, etc.—a preference is expressed for the trapezoidal rule of calculation used in Continental Europe and elsewhere over Simpson's rules, used in Great Britain.

W. P. Stevens, who read a paper on the center-board, concludes that "while the center-board has been at times an instrument of evil, through the easy way which it opens to bad design and construction, the device when properly handled by the honest and skillful designer is of the highest possible utility." Prof. William S. Aldrick, in a paper on "Engineering Research in the Navy," showed the growing necessity for such research and advocated the establishment by act of congress of a nautical engineering laboratory. The ventilation of ships was considered by F. B. Dowst, who called attention to the necessity of paying greater attention to hygrometric conditions and of flushing damp rooms with dry air.

The signal torch manufactured by the Graham-Meyer Torch and Liquid Light Co. of Boston, and which is being quite generally adopted for sailing and towing vessels, is now employed quite extensively by state military organizations for signal service. Officers of nearly all the regiments in the National Guard of New York and Massachusetts are equipping their signal corps with the torches. Neither rain nor heavy wind has any effect on this torch and the best feature of it is its burning qualities in all kinds of weather.

ALL NEW HYDROGRAPHIC CHARTS ARE KEPT IN STOCK BY THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND.

Marine Boiler Tests.

The water-pressure test allowed by the British admiralty provides that not four-ninths of the ultimate strength of the shell shall be exceeded, and the working pressure is fixed at 90 pounds below the test pressure, which is called the "constant margin" of safety for all pressures. The British board of trade allows a factor of safety of 4.5, with additions according to the circumstances of each case. Lloyd's committee adds ⅛ inch, and the British Corporation add one-sixteenth of an inch to all thicknesses for wear, and their constants vary according to the form of riveted joint. Hamburg rules allow a factor of safety of 5.0, reduced to 4.7 when the longitudinal seams are drilled and double-riveted. The Bureau Veritas allows a factor of safety of 4.4 after the plates have been corroded away by 0.04 inch. These authorities all differ in their respective rules for diameter of shafts, thickness of plates forming flat surfaces, stress on stays, thickness of plain or corrugated furnace tubes, steam pipes and area of safety valves.—The Engineer, New York.

SCHOONERS MOONLIGHT AND H. A. KENT ON CHOCOLAY BEACH, NEAR MARQUETTE, LAKE SUPERIOR—WRECKED SEPT. 9, 1895, WITH STEAMER C. J. KERSHAW, WHICH WAS ENTIRELY BROKEN UP IN A FEW HOURS.

Another Effort to Light Diamond Shoal.

The United States light-house board has decided upon another effort to establish a light-house on outer Diamond shoal, off Cape Hatteras. Work on the structure will be begun next spring.

If it is ever completed it will represent the most difficult piece of engineering work the service has yet encountered and will stand as the most conspicuous light-house in the world There is wide difference of opinion regarding the practicability of placing a light on a shoal known to be the most treacherous, and presenting more engineering difficulties to be overcome than any light-house service has yet had to deal with, but Washington heads of the service seem to hold to the opinion that a light can be erected which will withstand the terrific blows it must encounter from waves and shifting sands. In a few weeks the government will advertise for material, and early in the spring the actual work on the light will begin under government engineering supervision. The new plans contemplate an immense structure, built on the screw pile order, with the foundation of the light practically 100 feet beneath the wave surface and protected on all sides by hundreds of tons of rip-rap to prevent damage from shifting sands. Iron piles will be driven down by hydraulic pressure until a sound footing is secured, and the actual structure for the light keepers and materials to maintain the light will be built on the interior of the skeleton to a height of 165 feet above the water. The cost of the structure when completed is estimated at $1,200,000, and of this sum there is now available $400,000. Diamond shoal projects into the sea seven miles off Hatteras, and is covered with from 6 to 20 feet of water. It is marked now only the Hatteras light, standing on shore seven miles from the outer edge, and not discernable in hazy or foggy weather. The proposed light will be on the extreme edge, seven miles from the nearest shore and visible twenty-three nautical miles. The latest fog apparatus will be provided, and there will be accommodations for three keepers. It will probably take two years to complete the project from the date the work begins.

In a letter to the REVIEW ordering to ship builders in the east a few copies of papers containing illustrations of lake steamers, Reed H. Clark, who travels for the American Ship Windlass Co., and who is meeting ship builders and ship owners every day, says that he finds all over the country the greatest interest in ships that are being built on the lakes for passenger and freight service.

Touching Tribute to the Late Commander Heyerman.

Down below the rim of the eastern horizon there has disappeared a hero-shipmate, a loyal friend. The Master Mariner has laid His hand on yet another helm, and a craft of life, with side lights brightly burning, canvas of well-shaped conscience sheeted home and a crew of good deeds standing by at its stations, memory in check, to testify to staunchness, true sailing and sterling worth, has turned into the waters of the great unknown sea. Old sailors, wherever there may be an American warship, will doff their caps and bow their heads when the news is passed around. Oscar F. Heyerman, commander, navigator, and brother, is dead; and the appetite of a heartless naval department, "grown by what it is fed on," is satisfied.

Capt. Heyerman died at sea while on his way to visit his mother in Dresden. He wanted to see her before she died, he remarked, when he left his home in Detroit, but his wish was not gratified. His mother has not been well for several years, nor had he. In fact, he was bowed down under a burden of sorrow and in a condition of illness more dangerous than that of his mother. But to none did he speak of his illness and sorrow. A big man, with a correspondingly big heart and a will that would never say die, he concealed his condition of mind and body to the very last and he died without attaching any blame to those who had heaped all the misery upon him.

If anybody should ask a few petted admirers of Secretary Herbert what killed the victim of the Kearsarge court martial, it is just probable that they would not confine themselves to the truth. If anybody should ask the majority of officers at the Brooklyn, League island and Mare island navy yards what was primarily responsible for his untimely answer to the Roll Call, they would reply truthfully and without hesitation that he died of a broken heart. And if ever a man died of a broken heart, Commander Oscar F. Heyerman did. Court martialed because he did not happen to be, or want to be, one of a chosen few who "decorate," but do not "serve," the United States navy, he was tried and adjudged guilty of having, in connection with Lieut. Charles H. Lyman, his executive officer, wrecked the corvette Kearsarge, of Alabama fame, on Roncador reef, Feb. 2, 1894. Rear Admiral Bancroft Gherardi, since retired, was president of the court that tried the popular commander, and Lieut. Commander James D. J. Kelley, now executive officer of the battle ship Texas, was judge advocate. Both of these distinguished officers were entirely in sympathy with Commander Hyerman, but while it was shown absolutely that Lyman alone stood guilty for the loss of the destroyer of the Alabama, naval regulations, inflexible as they were unjust, made it mandatory upon them to hold Heyerman responsible for the defects and mistakes of his executive officer. "Poor Heyerman," said one of his classmates, when the sentence of two years' suspension was announced. "Good old soul, I feel sorry for him, I know him from cover to cover, and, mark me, this punishment will be a death blow to him. He is too sensitive to bear disgrace of this kind. It is an unmerited punishment, but the department must be obeyed."

This is the man that the United States government court martialed and, by so doing, caused his untimely death. This is the man who, when isolated on Roncador Reef and some of the sailors had confiscated a keg of rum, which they found in the surf, took the keg to a near by rock and knocked in its head. This is the man who, the day before all hands were saved, took a bandage from his ankle that he might give it to an injured marine. This is the man who, with Admiral Luce in the Yantic at Port-au-Prince, threatened to bombard Legitime and that city unless he immediately released the American steamer Haytien Republic, now the Portland, which had been seized there. This is also the man who, when yellow fever broke out on the Yantic while on her way to New York from Hayti, carried the sick to his own cabin and prepared the dead for the grave that is deep and unmarked. He is the man who was suspended with Col. Ludlow because they differed with other officers because of the location of lights in the St. Mary's river, which were afterward found to be as both officers said, and whose recommendations were afterward adopted in every detail by the light-house board. He is the man who never failed to go down in pocket when he met a sailor's widow or a sailor's child, and he died of a broken heart, a victim of the government. Commander Heyerman's good deeds will live after him. His sun is set, but its glow will illuminate the sky for many days. Sailors and marines without number will mourn his loss. He was their friend, and in life did much for them.—New York Mail and Express.

Following the refusal of both the president and the secretary of the navy to award contracts for two of the new gunboats to the Detroit Dry Dock Co., on account of the international agreement of 1817, a final decision as to the contracts has been made. Two of the boats, those of the twin-screw type, will be built by the Union Iron Works, San Francisco. Two of the single-screw boats will be constructed by the Bath Iron Works, Bath, Me.; one of the same type by Lewis Nixon, of the Crescent Ship Building Co., of Elizabethport, N. J., and the remaining boat, also a single-screw vessel, by John Dialogue & Sons, of Camden, N. J.

Ship Yard Matters.

Although owners of the Centurion figure on having her out of dock at West Superior by Saturday or Monday next, a report regarding her injuries is to the effect that some sixty plates were damaged. Repairs will probably cost full $10,000.

Capt. James Davidson, who now has four big wooden vessels under way at West Bay City, Mich., has made arrangements for machinery for the two steamers. He has contracted with the Frontier Iron Works, Detroit, for two triple expansion engines. One will be a duplicate of that in the Madagascar, the cylinders of which are 16, 25 and 42 inches diameter and the stroke 34 inches. The other is a duplicate of that now in the Rappahannock—20, 32 and 54 inches diameter of cylinders and 42 inches stroke.

Samuel F. Hodge & Co. of Detroit are building engines for the steel steam yacht that is to be constructed during the winter by the Union Dry Dock Co of Buffalo. They are to be triple expansion, with cylinders 10½, 17 and 27 inches diameter and 16 inches stroke. The boiler is to be of the Taylor water tube type, 8 feet 7 inches by 7 feet 8 inches and 10 feet high. This company is also building a new engine for the passenger steamer City of Marquette. It is of the compound type, with cylinders 15 and 30 inches diameter and a stroke of 24 inches.

F. S. Manton of the American Ship Windlass Co., Providence, R. I., has been calling on lake ship builders and vessel owners during the past week. Mr. Manton says that with the opening of next season his company will have finished seventeen of the big towing machines that are being adopted for all of the modern steel tow barges on the lakes. He points with pride to the fact that for a great number of years past the Cramps have bought from him, with only two exceptions, all the windlasses going onto ships built at the big Philadelphia plant. John Roach bought 95 per cent. of his windlasses from the Providence concern and the Newport News company has never had any other windlass. In only one instance has the Cleveland Ship Building Co. bought any other windlass. The Chicago Ship Building Co. is also among the list of builders who have bought only the Providence machine.

Bids on a Light-Vessel.

Following is a schedule of the bids opened at the office of the light-house board, Washington, D. C., Nov. 8, 1895, for the construction and delivery of one first-cless composite light-vessel, No. 67. The Bath Iron Works seems to be the lowest bidder.

Bath Iron Works, L't'd., Bath, Me	$63,900
George Lawley & Son, Boston, Mass.	66,500
W. S. Woodall & Co., Baltimore, Md.	76,234
C. Reeder & Sons, Baltimore, Md.	79,750
Pusey & Jones Co., Wilmington, Del.	83,000
Bell's Steam Engine Works, Buffalo, N. Y.	86,750
Atlantic Works, Boston, Mass., (power or economy, as specified, not guaranteed)	93,500
Delivery to be made at Tompkinsville, N. Y.	
John F. Steffen, Portland, Ore.	69 750
Moran Bros. Co, Seattle, Wash.	75,880
Union Iron Works, San Francisco, Cal.	95,000
Fulton Engine and Ship Building Works, San Francisco.	123,000
Delivery to be made at Astoria, Ore.	
John H. Dialogue & Son, Camden, N. J.	74,000
Delivery at Camden.	
Atlantic Works, Boston, Mass.	75,900
Delivery at Boston.	

Around the Lakes.

Buffalo has been receiving grain during the past ten days at the rate of about 10,000,000 bushels daily.

All contracts have been let for the new Mesabi ore dock at Duluth and pile driving for the approach to the dock has been started.

An advertisement appears elsewhere in this issue from a vessel owner who wishes to purchase a lumber schooner of about 350M feet capacity.

Edward S. Mitchell, ex-mayor of Oswego and who was some time ago interested in vessel property, died at his home in that city on Thursday last. He was fifty-eight years of age.

Letters bearing the following names await owners at the marine post office, Detroit, Mich.: Alex Blake, W. G. Bonchay, James McCann, John Nugent, J. O'Connor, Chris Reynolds, A. Stevens, Nele Slaght and Millie Tucker.

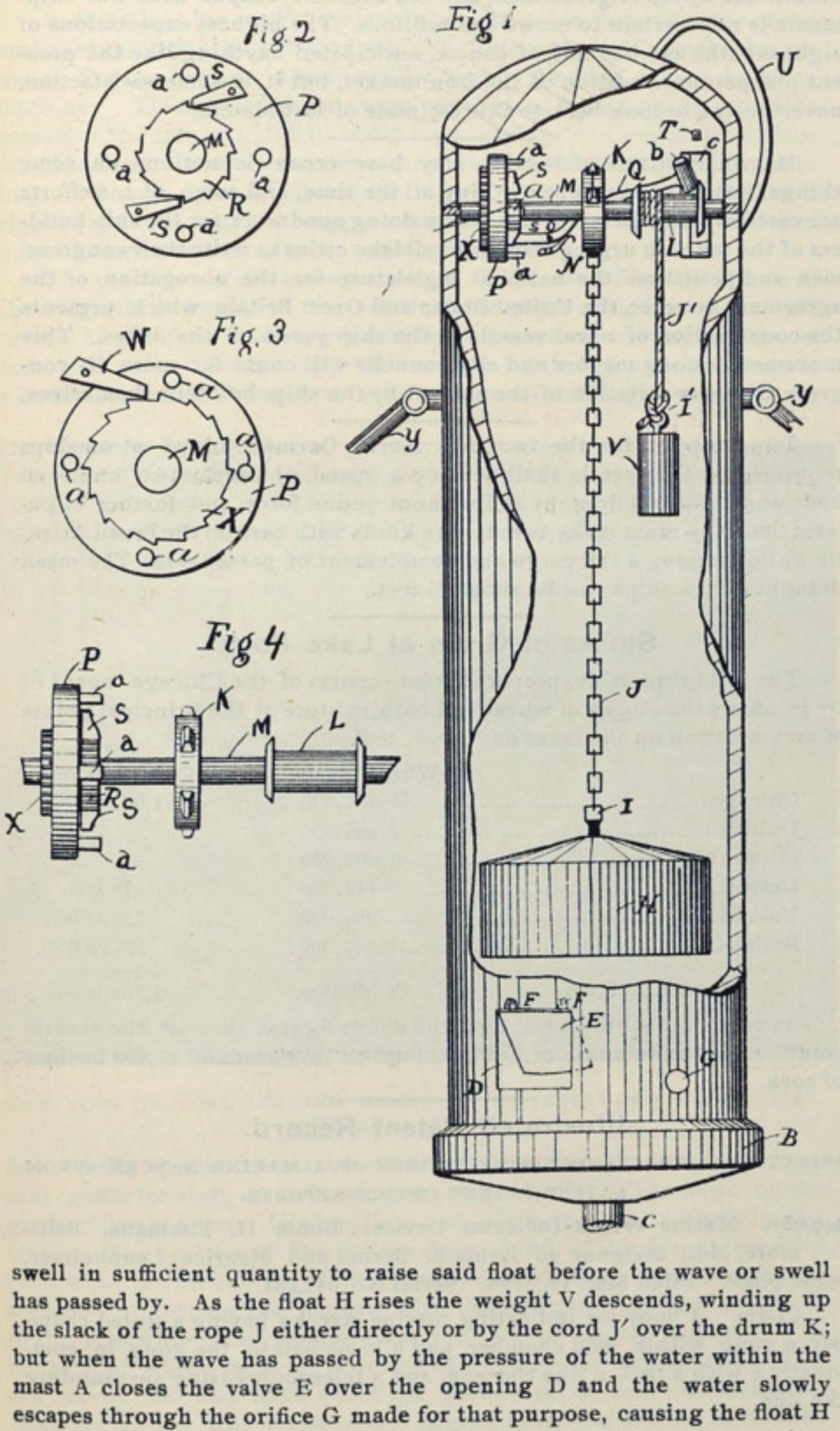
A reef has been found one mile distant from Port Austin light in a N. N. W. direction. It consists of a narrow ledge of bowlders, one-fourth of a mile long, lying east and west, with 12 feet of water over it. Two temporary buoys have been placed over the spot.

Several reports from Houghton, Mich., are all to the effect that there is a greater depth of water throughout Portage lake canals than is to be found in the Sault river, and that of late a large number of vessels have been passing through the canals in preference to rounding Keweenaw point.

Fog Signal Operated by Wave Motion.

Fog signals that are operated by wave motion, through being exposed to the swell of a lake or sea, are becoming quite numerous. Harry J. Chapman of Bangor, Me., recently invented an apparatus of this kind which contains some novel features. In this pneumatic alarm a bell is sounded by a mechanism actuated by a weight and float within a hollow mast or compartment. The operation of the mechanism, which is illustrated in the accompanying engraving, is thus described:

When the swell or wave is passing, the water will force open the valve E and flow up into the mast A, raising the float H at the same time, the value being of sufficient size to admit the water forced by the wave or



swell in sufficient quantity to raise said float before the wave or swell has passed by. As the float H rises the weight V descends, winding up the slack of the rope J either directly or by the cord J′ over the drum K; but when the wave has passed by the pressure of the water within the mast A closes the valve E over the opening D and the water slowly escapes through the orifice G made for that purpose, causing the float H to gradually descend, and the chain J, by means of the drum K, revolves the axle M, the ratchet R engages with the pawls S, S, and revolves the wheel P, which trips the lever Q by means of the pins *a a a a* thereon, which may be of any number, and the hammer *b* falls on the bell U and sounds an alarm. The click W engages with the ratchet X and prevents the wheel P from turning backward as the weight V descends and revolves the axle M in the opposite direction from that in which it turned when the float H descended. The spring N holds the hammer *b* normally up off the bell, so that its resonance is not deadened.

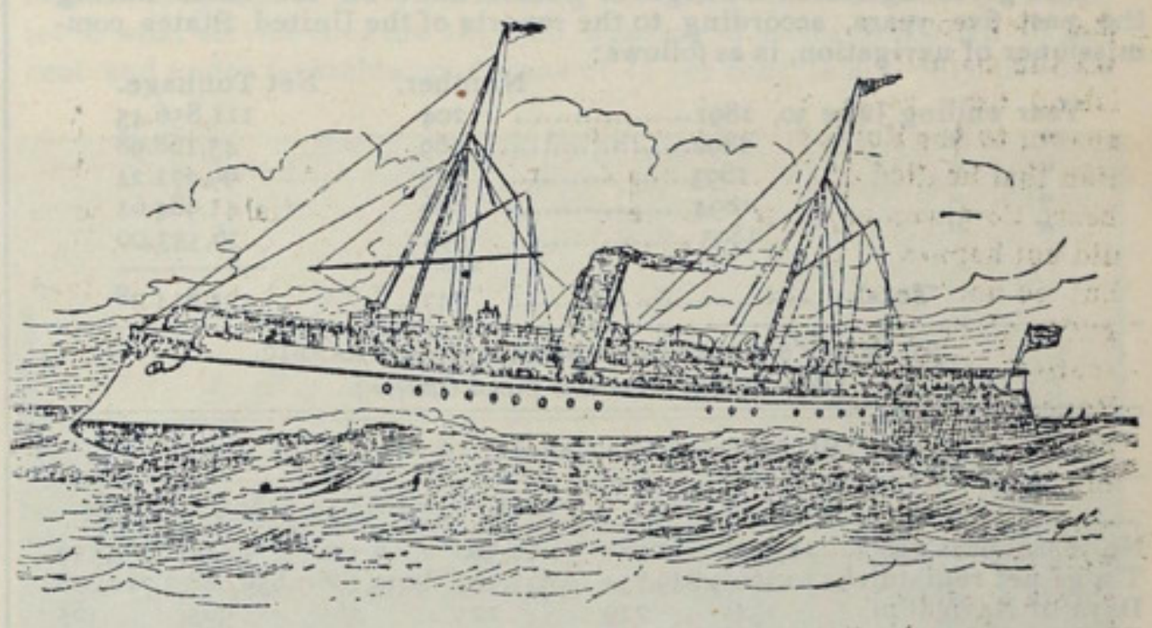
The machine can be operated only when in a position where it will be exposed to the waves and swell of the sea. It is not claimed that the alarm will be sounded at exactly equal intervals. The number of alarms will depend on the number of pins on the wheel P and the size of the orifice G and the frequency of the waves or swell.

According to returns received by the Iron Age, pig iron production on Nov. 1 had reached the enormous total of 217,306 gross tons weekly October production is estimated at 915,346 tons, as contrasted with 763,354 tons in July.

Steam Yacht Designed for War Service.

F. W. Morgan of Chicago has let a contract to the Racine Boat Manufacturing Co., of Racine, Wis., for a steel steam yacht that will resemble a modern torpedo boat. It is the intention to have the vessel conform to certain requirements of the navy department, so that upon occasion arising the deck house could, within a very short period, be taken off, a conning tower substited, gun circles and a battery of torpedo guns, rapid fire, and machine guns mounted, and the yacht would be transformed into a war vessel without an equal on the lakes. In close quarters the ram-shaped bow would sink any ship on the lakes. Theodore Poekel, manager of the Racine company, is a naval architect and was for some time engaged with the Herreshoffs at Bristol, R. I., and George Warrington of Chicago, who will supervise the construction of the vessel in the interest of the owner, is also well known as a designer of fast steam yachts and marine machinery. The engraving is from a drawing made by Geo. A. Coffin, artist on the Chicago Tribune.

The yacht will be schooner-rigged, carrying two pole masts and a spread of sail which would enable her to care for herself in event of accident to engines or boilers. Five steel water-tight bulkheads will divide the hull into six compartments. Dimensions are 140 feet on water line, 130 feet on deck, 17 feet 4 inches beam on water line, and 18 feet 3 inches beam on deck. The bow will project 6 feet beyond the deck, sloping out and down to the water line. From the water line the



forefoot is cut away so as to give it the ram shape similar to the bows of the United States cruisers Minneapolis, New York and Columbia.

Forward of the engine and boiler space, the entire hull will be devoted to officers' quarters. There will be a gally running the full width of the yacht, mess room and state rooms for the officers, ice boxes and storage, and in the extreme bow chain lockers and forecastle with crew's quarters. Abaft the engine space will be located the owner's and guests' quarters which will include four state rooms, with elaborate toilet accommodations, and a saloon 18 feet long extending across the full width of the ship. On deck forward of the engine and boiler rooms will be located a deckhouse about 30 feet long with bridge and steering wheel, search light, etc., on top. This deckhouse will be used as a dining room and general sitting room, and will contain a steering wheel in the forward end for use in bad weather.

The yacht's engine is to be of the four-cylinder, triple-expansion type, the cylinders being 13, 19½, 20 and 20 inches diameter, by 15 inches stroke. This is to turn a bronze screw of 5 feet 6 inches diameter, and at 300 revolutions it is expected that the yacht will attain a speed of 18 miles an hour. The boiler will be of the water tube type, having 52 square feet of grate surface and allowed 250 pounds working pressure. At this pressure the engines are expected to develop 850 horse power. Pumps, electric plant and other auxiliaries will add about 60 horse power.

The building of this vessel may again direct attention to the treaty of 1817, which has prevented lake ship builders from securing contracts for the construction of vessels of war.

The REVIEW has just received from John Berkinbine of Philadelphia, well known authority on iron matters, a most comprehensive report on the iron ores of the world, which has just been published as a reprint from the "Mineral Resources of the United States for the Year 1895," issued by the United States Geological Survey at Washington. It constitutes a handsomely printed volume of over 200 pages and practically summarizes recent current literature on the subject, enriched by many private communications. It is accompanied by a number of maps and statistical diagrams.

Latest reports from Japan are to the effect that the empire will let contracts for ten big vessels of war, giving two each to builders in England, France, Germany, Italy and the United States.

MARINE REVIEW

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department on June 30, 1895, contained the names of 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,-642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels	1,755	857,735.00
Sailing vessels	1,100	300,642.00
Unrigged	487	83,082.00
Total	3,342	1,241,459.00

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

		Number.	Net Tonnage.
Year ending June 30,	1891	204	111,856.45
" " "	1892	169	45,168.98
" " "	1893	175	99,271.24
" " "	1894	106	41,984.61
" " "	1895	93	36,353.00
Total		747	334,634.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net registd	13,110,366	9,849,754	10,647,203	8,039,106	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

OFFICERS of the Lake Carriers' Association have been consulted in the matter of engaging an ice-crushing steamer to keep a channel open in the St. Mary's river for five to ten days after the weather sets in cold enough, late this month or early in December, to prevent the passage of vessels at certain points in the river where ice forms earlier than it does at the canal. A Duluth vessel owner has made arrangements with the owners of a vessel suited to this service to have the vessel begin running up and down the river about Nov. 20th or 25th, and he is anxious to have the Lake Carriers' Association, or a certain number of owners of vessels trading to Lake Superior, join in paying for the work. It is needless to say that the officers of the association have refused to take any part in the scheme. They realize that they have no authority to tax vessels in the association for the accommodation of outsiders; neither have they any right to provide a channel for such vessels of the association as might be running late to Lake Superior, and ask owners who were not benefited by the operation to share a portion of the cost. They have had some experience with work of this kind in the past, when blockades have occurred in the spring, and they wish to stand clear of anything of the kind in the future. The Duluth projector of the scheme is now trying to interest owners as individuals to sign an agreement covering the cost of the service but it is more than probable that the effort will fail, as there is no telling what boats may remain on Lake Superior late enough to require the assistance of an ice-crushing steamer in the Sault river.

ABOUT $4,000,000 of the $9,000,000 to be expended on the New York state canals, in accordance with the vote at the late election, will be available shortly after Jan. 1 next. Bonds to be issued for carrying out the improvement are to be sold as required in lots not to exceed $4,000,-000 and are to bear interest not to exceed 4 per cent. and to run for not more than seventeen years. All of the canals are included, but the Erie is to get the big share of the improvements. The Erie is to be deepened to not less than 9 feet, except over and across aqueducts, mitre sills, culverts, and other permanent structures, where the depth of water shall be at least 8 feet, but the deepening may be performed by raising the banks wherever the same may be practicable. The law also provides for the lengthening or improving of the locks which now remain to be lengthened, and for providing the necessary machinery for drawing boats into the improvised locks and for building vertical stone walls where, in the opinion of the state officials, it may be necessary. Improvements on the Oswego canal are to be the same as those of the Erie but the Champlain canal is to be deepened to only 7 feet. All work is to be done by contract, to the lowest bidder, and in no case shall the amount of any contract exceed $500,000.

SOME TIME before the opening of navigation in March last, the REVIEW advanced the opinion that shipments of iron ore this season would be nearer 10,000,000 than 8,000,000 gross tons, the latter figure being the amount fixed by the ore interests after the Bessemer output had been apportioned among the different companies producing high-grade ores. The output of ore from all upper lake ports up to the first of the present month was 9,346,741 gross tons, and the season's output with rail shipments is now certain to crowd ten millions. The highest expectations of eight months ago had not, of course, anticipated anything like the present prosperous condition of the iron market, but it is some satisfaction, nevertheless, to look back to this estimate of last March.

MAYOR PINGREE of Detroit may have eccentric notions on some things, but he seems to be working all the time, and some of his efforts are certainly well directed. He is now doing good work for the ship builders of the lakes in urging officials of all lake cities to write their congressmen and petitition the national legislature for the abrogation of the agreement between the United States and Great Britain which presents the construction of naval vessels in the ship yards of the lakes. This movement among mayors and city councils will count for more in congress than any agitation of the subject by the ship builders themselves.

THE contract for the two new North German Lloyd steamships requires that the vessels shall develop a speed of twenty-two knots an hour under natural draught and without undue force, and further stipulates that they must make twenty-one knots with ease on the broad Atlantic while carrying a full cargo and complement of passengers. The mean draught of the ships will be about 25 feet.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on Nov. 9, 1895:

	Wheat, bushels.	Corn, bushels.
Chicago	19,854,000	1,021,000
Duluth	5,386,000	.....
Milwaukee	600,000	.....
Detroit	444,000	18,000
Toledo	965,000	126,000
Buffalo	2,453,000	423 ,000
Total	29,702,000	1,768,000

As compared with a week ago, the above figures show at the several points named an increase of 1,635,000 bushels of wheat and 93,000 bushels of corn.

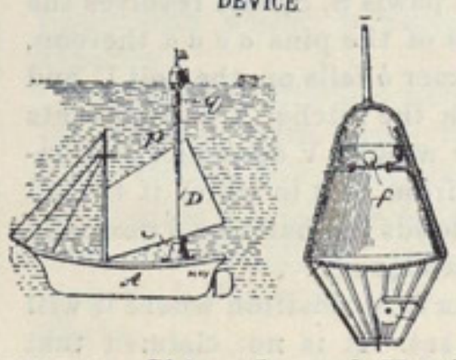
Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

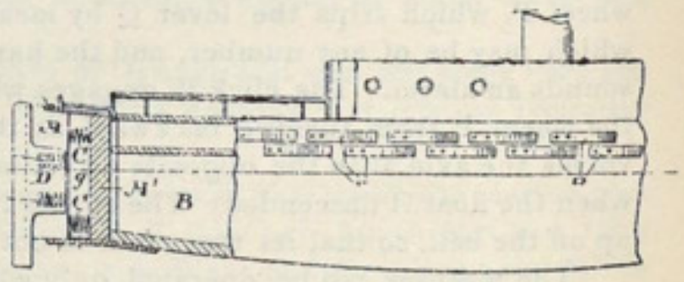
549,281. Marine-Wreck-Indicator Device. Louis H. Timmans, Baltimore, Md., assignor to Louis B. Bernei and Maurice Laupheimer, same place. Filed Mar. 18, 1895. Serial No. 542,234.

Claim. A buoy for indicating marine wrecks having a sealed chamber, a gong within said chamber and a loose ball in the gong, in combination with a reel, a line thereon, and a telescopic casing surrounding the line.

549 281 MARINE-WRECK-INDICATING DEVICE



549,319 SHIP.



549,319. Ship. Samuel Katzin, Newark, N. J., assignor of one-third to Morris Katzin, same place. Filed June 13, 1895. Serial No. 552,637.

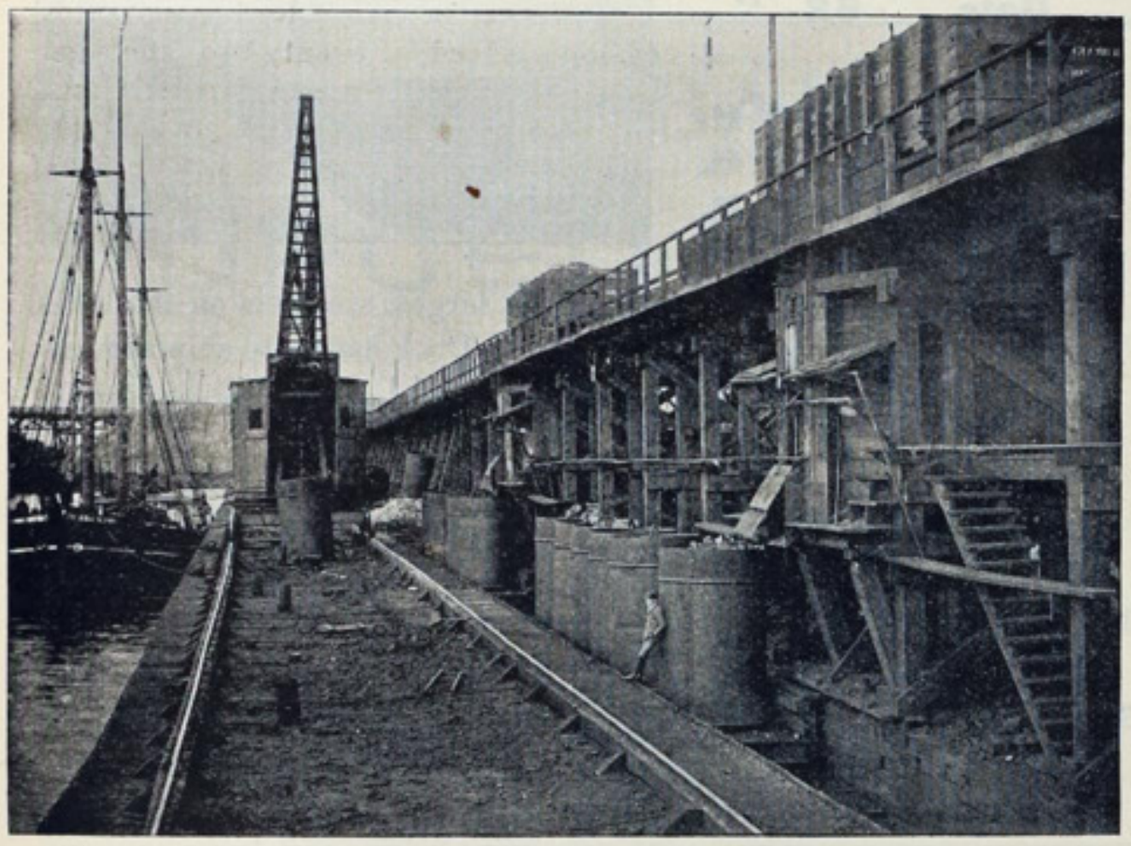
Claim. The combination, in a ship, of a bow composed of two parts, and located at a distance in front of the hull, springs between the bow and the hull, a plate between the two parts of the bow, springs connected with the rear edge of the plate and with the parts of the bow, whereby the front edge of the plate is normally held in front of the bow, and plates for covering the space between the bow and the hull.

Another Big Plant for Loading Soft Coal.

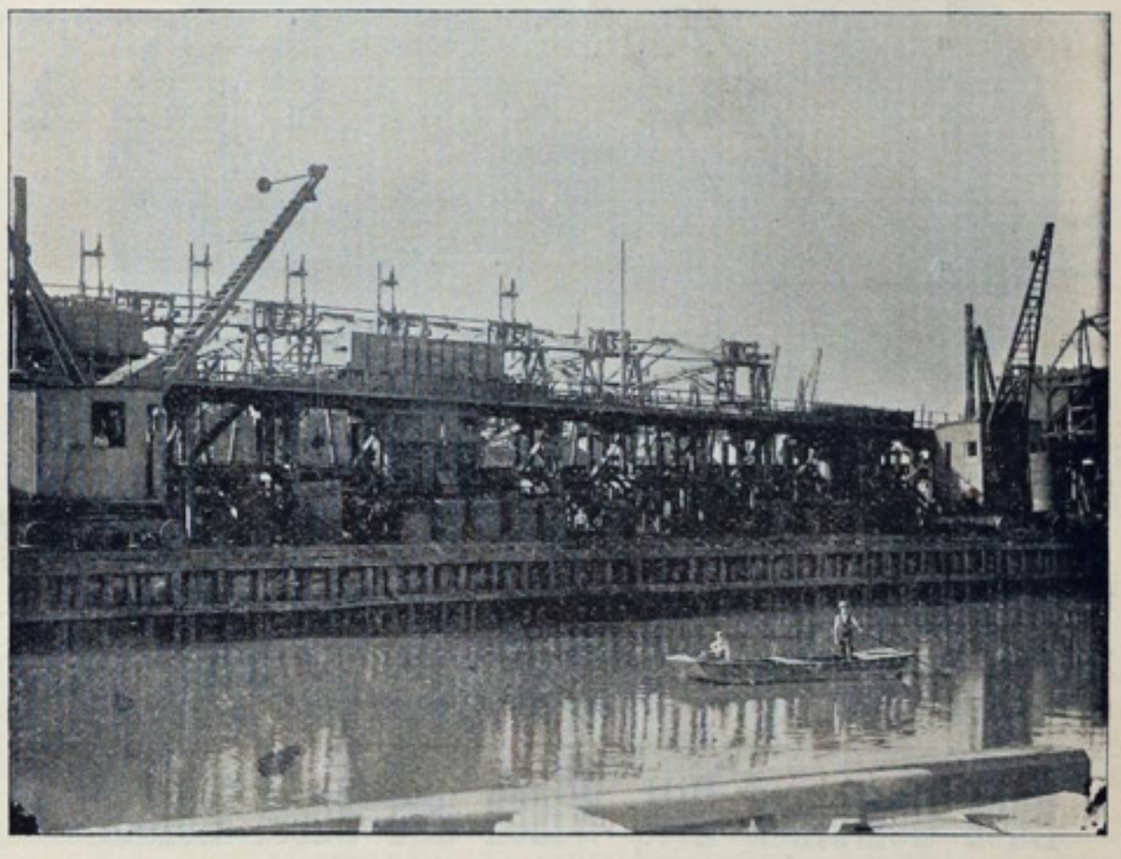
Two views of a big plant for loading bituminous coal into vessels, which was recently put in operation on the Pennsylvania Co's. docks at Ashtabula harbor, are presented on this page. Coal and ore handling machinery on the docks of the Pennsylvania Co. at Ashtabula is all operated by the firm of M. A. Hanna & Co., Cleveland, who are extensive miners and shippers of these commodities and who control lines of big steamers engaged entirely in the coarse freight trade. In this plant, as in the coal car dumping machines, one of the great objects is to avoid breakage of the coal, thus upholding its commercial value. Otherwise chutes leading into the holds of vessels, through numerous hatches, direct from pockets in high docks, might be used as is done with hard coal at Buffalo and Toledo.

In this plant the pocket system is not discarded, but breakage of the coal through shoveling or through the chute system is avoided by the use of five-ton buckets which are handled by two big rotary hoisting machines. This plant has for several weeks past been loading coal into vessels at the rate of 15,000 to 18,000 tons weekly, and under conditions favorble to an increased supply of coal and vessels this record could be improved upon. As high as 3,600 tons of coal has been loaded in a single day and it is more than probable that 4,000 tons could be loaded in a day if there was necessity for pushing the work.

The condition of dock property back of the water frontage shown in the engravings prompted the trestle-work plant as against any of the several kinds of car dumping machines that are now coming into use at Lake Erie ports. Behind the trestle-work is a side hill, on which there is a track approach of about three-quarters of a mile leading in semi-circular



SIDE VIEW OF COAL LOADING PLANT ON PENNSYLVANIA CO'S. DOCKS, ASHTABULA HARBOR, O.



FRONT VIEW OF COAL LOADING PLANT ON PENNSYLVANIA CO'S. DOCKS, ASHTABULA HARBOR, O.

form to the trestle. Just above the trestle is storage room on a 1 per cent grade for sixty cars of coal, that can gradually be run down on the grade, four at a time, to a position just above the two pockets in the trestle. The cars are of the bottom-dump kind, of thirty tons capacity each, while the pockets are of fifteen tons capacity each. It will readily be seen that by keeping the pockets filled there is only a sliding motion to to the coal while it is passing from the cars to the big buckets. The buckets, of which there are fourteen of the five-ton bottom-dump kind, are moved back and forth under the pockets on an iron car, which derives its motion from a stationary engine operating a drum and cable. The system of handling the buckets is the same as that which has been in use on the lakes for some time past. Two big rotary hoists, which run up and down a track of wide guage, revolving and hoisting at the same time, are used for this purpose. Doors in the chutes from which the coal is let out of the pockets into the buckets are operated by steam, and are readily opened or closed with the filling of each bucket.

This plant has loaded coal at the rate of four thirty-ton cars every fifteen minutes, and Mr. D. R. Hanna, who is in charge of the coal business of M. A. Hanna & Co., is of the opinion that even this rapid rate of loading may be exceeded later on. He estimates that with the new plant for unloading ore, which includes ten hoists that may all be worked on a single vessel of the 400-foot type, the docks on the Pennsylvania side at Ashtabula may handle close to 2,000,000 tons of coal and ore next season.

These docks are probably better equipped now for rapid handling of coal and ore than any docks on the lakes. The designs of machinery are from suggestions made by members of the firm of M. A. Hanna & Co., and which were worked out by the Pennsylvania Co's engineers. Structural work in the principal fast ore handling machinery was carried out by the King Bridge Co. of Cleveland.

Waste of Fuel.

Chas. W. Whitney, Manhattan Life building, New York, writes some of the most interesting letters that are received at this office from patrons of the REVIEW. Mr. Whitney is known to ship and engine builders as the American representative of English firms manufacturing specialties that are adapted to fuel economy on ships. In a letter of recent date he says:

"It has been remarked that the average American family wastes as much food as would support an average family of the same size in Continental Europe. From my own observation I should say this was essentially true, if we consider food 'wasted' that is consumed in excess of what nature requires for our well-being. We Americans are notoriously the most 'dyspeptic' people on the face of the earth, and this is largely due to over-eating and to the character of the food we eat. But what I want to say a few words about now is our apparent disregard of the waste of fuel in our manufacturing establishments, in our steamers, on our railways, in our electric plants, and wherever fuel is an important factor in the cost of power. To illustrate the case I take the cost of fuel in our navy. The late annual report of Commander F. E. Chadwick, chief of the bureau of equipment, navy department, Washington, shows that 98,615 tons of coal were purchased in 1895 for the use of our navy, at an average cost of $5.35 per ton, making a total cost of $527,590. Now nobody objects to this cost if it is a necessity, but let us consider whether it is a necessity or not. I contend it is not, and I assert most emphatically that by simply changing the tubes in our steamers, no matter in what service they are engaged, a saving of never less than 10 per cent. and under favorable conditions of 15 per cent. is not only possible but assured, and if any one who may glance at this statement questions it and will so advise me, I shall be most happy to supply the proof in such form that no one can successfully dispute it."

A circular accompanying the above contains the names of some ninety-five steamers fitted with Serve's ribbed steel boiler tubes, and among them are five of the American line, including the St. Paul, and eight of the White Star line. It is claimed that on none of these vessels is the saving of fuel, brought about by the use of these tubes, less than 10 per cent. and on some of them it exceeds 15 per cent. Over 15,000 of Purves' ribbed furnace flues, which are also sold in this country by Mr. Whitney, are now in use in marine boilers.

The committee of awards of the World's Columbian Exposition has reported that out of about 250,000 exhibits and 65,422 exhibitors there were but 23,586 awards. It is claimed that this is a smaller percentage of exhibits receiving awards than prevailed at any previous international exposition. With a non-competitive system of awards the fear was originally expressed that there would be such an excess of awards as to cheapen their value; but although the judges were left free to grant as many awards as they saw fit, the result has been the reverse of that expected.

A new steel plate bellows forge, which is being introduced by the Buffalo Forge Co., Buffalo, N. Y., is especially adapted to the work of ship builders, bridge builders, boiler makers and out door structural work of all kinds. It is light and durable, can be shipped anywhere without boxing, and has double-acting bellows and improved relief valve.

MASTERS OF LAKE VESSELS CAN NOT WELL AFFORD TO BE WITHOUT THE NEW CHARTS. EXAMINE THEM AT THE OFFICE OF THE REVIEW.

ONE OF THESE BINDERS

that will hold 52 NUMBERS of the

MARINE REVIEW,

Will be mailed to any address on receipt of $1.

MARINE REVIEW...
516 Perry-Payne Bldg.,
CLEVELAND, O.

WANTED TO PURCHASE A **Lumber Schooner.**

Capacity not less than 350 M feet. Must be cheap.
Give full description. Address.

Box 714, Ludington, Mich.

Nov. 14.

For Sale Cheap ..FOUR HARBOR TUGS,

ALL WITH ENGINES 18 x 20, AND IN GOOD CONDITION.
HIGGIE & SHAW, Vessel Agents,
No. 1 Franklin Street, CHICAGO, ILL.

Jeffery's Marine Glue

For Paying Seams of Decks and other purposes.

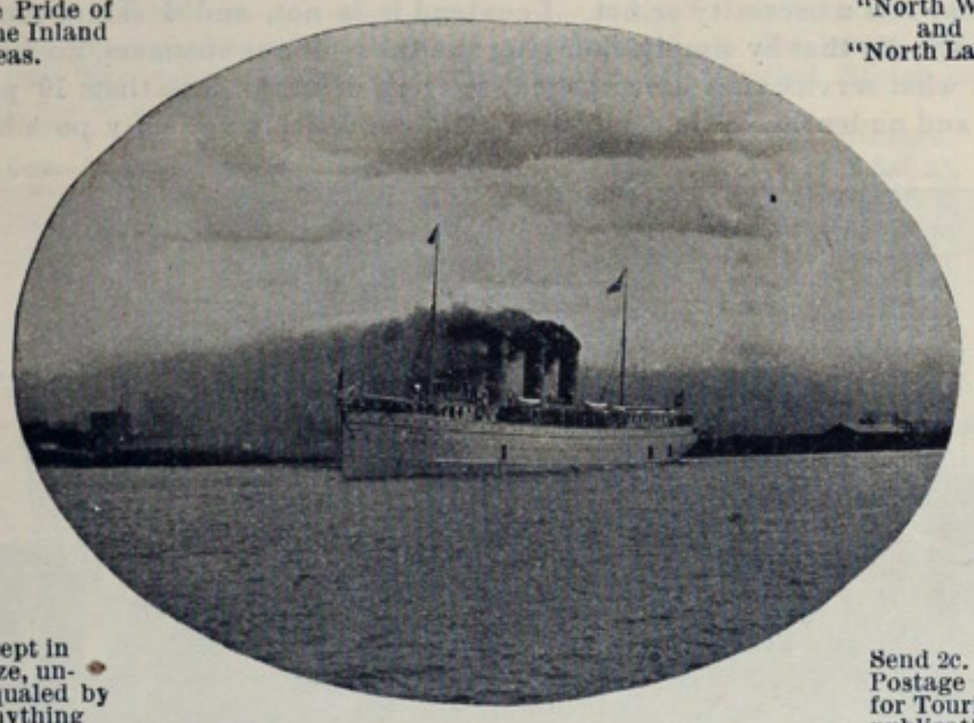
L. W. FERDINAND & CO., Boston, Mass.
Send for Circular.

OUT OF THE BEATEN PATH Are the Vacation Trips on the Great Lakes offered by The **Northern Steamship Company's**

Exclusively Passenger Steamships.

The Pride of the Inland Seas.

"North West" and "North Land."



Except in size, unequaled by anything afloat.

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Semi-weekly service. Forming in connection with the Great Northern Railway,
The Dustless and Most Delightful Route Across the Continent.
A. A. HEARD, General Passenger Agt., **BUFFALO, N.Y.**

DUNFORD & ALVERSON,
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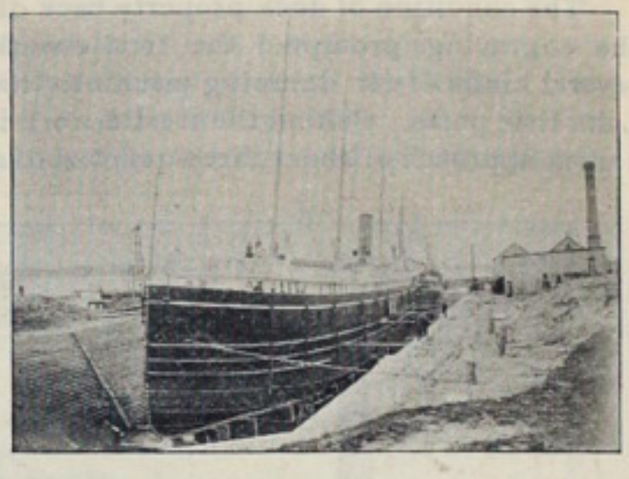
Length, 400 feet,
Width:
On top, 95 feet,
Bottom, 55 "
Gate, 62 "
Depth:
To Floor, 20 ft.
To Sill, 18 ft.
On Blocks, 16 ft.



Dry Dock large enough to dock the largest steamers on the lakes. Docking, Repairing and Spar Making. Dock has pit to ship rudders.

THIS IS THE NEAREST MODERN DOCK TO THE SAULT OR MACKINAW.

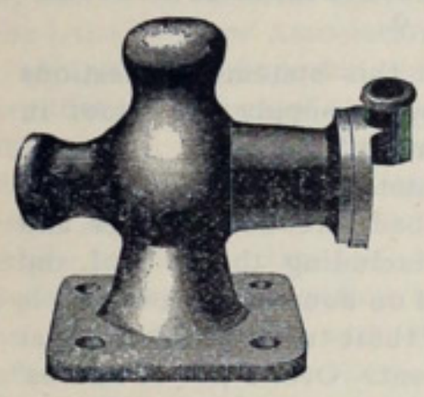
NAUTICAL WATCH CHAIN.

Solid Gold. Ship-shape in every detail.
Send for Descriptive Circular.

MORGAN A. ROBERTSON,
26 John Street, NEW YORK.

Enos Combined Bitt, Winch and Sheet Holder.

Patented U. S. A., England and Canada.



Takes the place of wooden or iron bitts and forms a Combination Bitt and Winch. Takes up less room than the ordinary bitt. Can be used to great advantage as a Windlass or Sheet Holder on Yachts. An examination will convince you of the many uses to which it can be put.

FOR SALE BY

H. Channon Company, Chicago, Ill.
Upson, Walton & Co., Cleveland, Ohio.
Howard H. Baker & Co., Buffalo, N. Y.
M. I. Wilcox Cordage & Supply Co., Toledo, O.
H. D. Edwards & Co., Detroit, Mich.
Henry Beckman & Son, Erie, Pa.
And by Ship Chandlers in every seaport city lake port and town.

THE ENOS SHEET HOLDER CO.
Manufacturers and Proprietors, PEABODY, MASS.

To Vessel Owners and Captains

Look out for **Graham's Coal Dock,** *foot of 21st St., Detroit.*
1,000 Tons, *best quality, on hand all the time* **Fresh on Cars.**
You can get it from **Chutes, High Platform or Dock.**
Chutes fit highest or lowest boats, and can give as quick dispatch as at any dock. Widest point on the river, and nothing to interfere in rounding to with tows.
No Car Boats, Ferry Boats or Elevators in the way.
Ten Minutes Ride to City Hall. *Supplies right at hand.*

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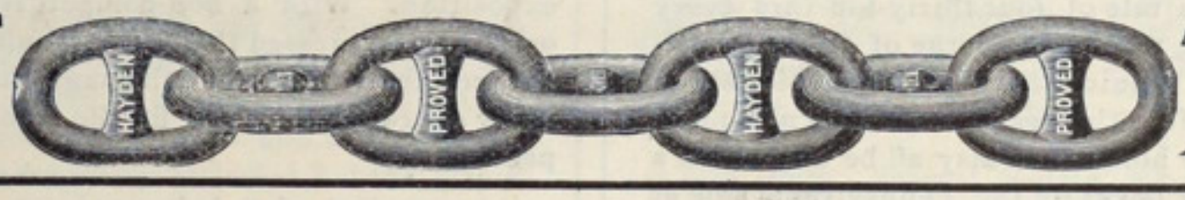
JAMES GRAHAM, DETROIT, MICH.

Chain Department ✻ P. HAYDEN S. H. CO. ✻ Columbus, Ohio.

Our Chain in use on the Largest Steamers on the Lakes:
The Zenith City, Victory, North West and North Land, and many others.



All kinds of Chain—
Stud and Close Link,
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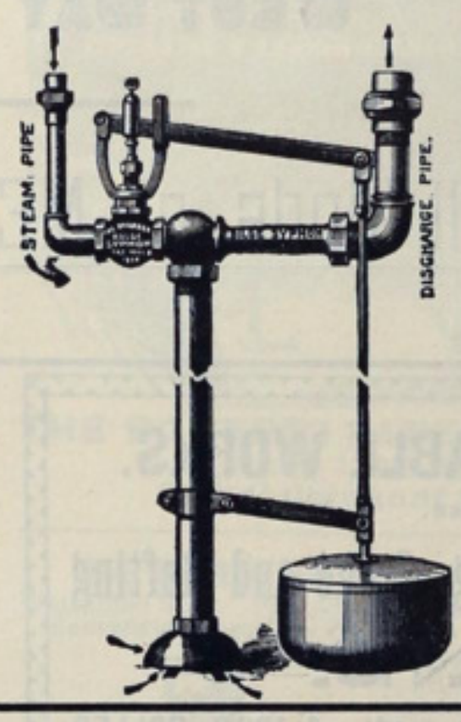

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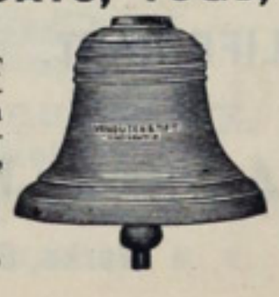

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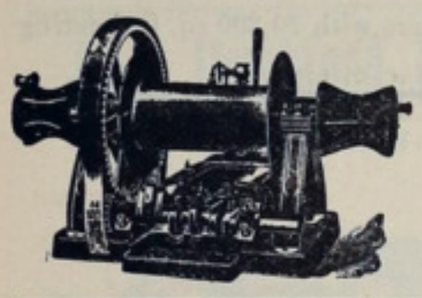

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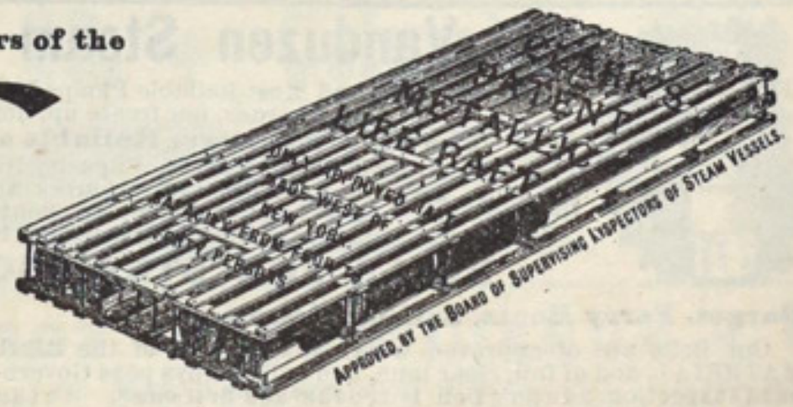

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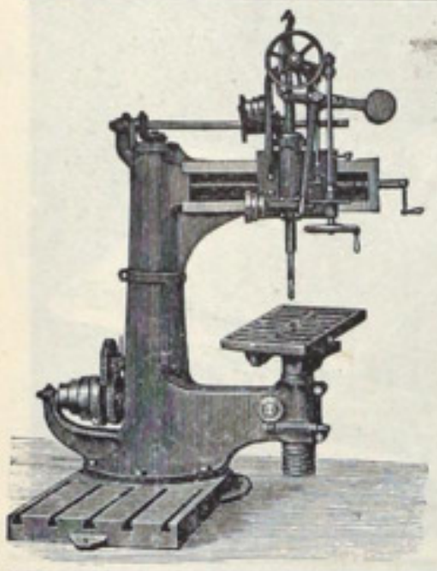

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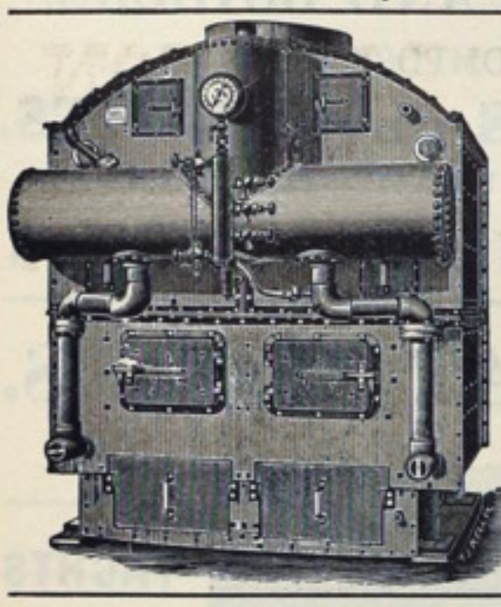

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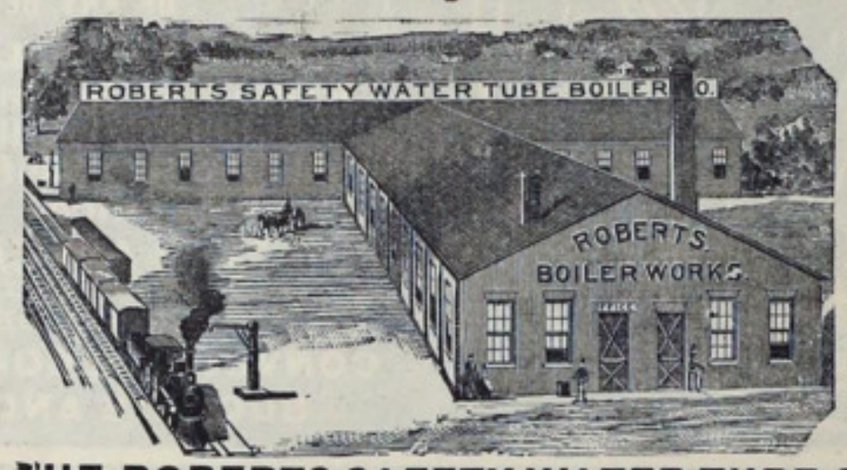

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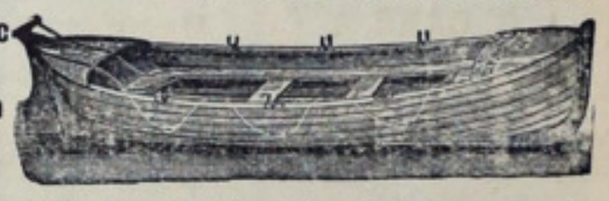

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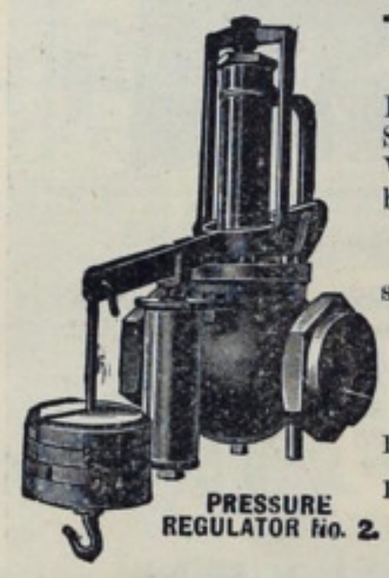

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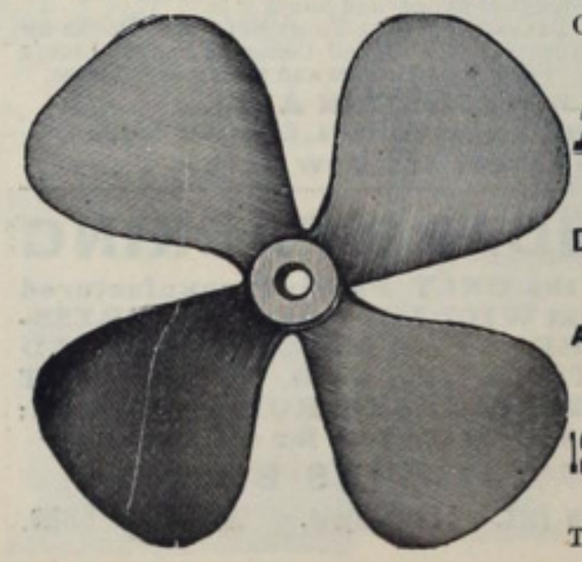

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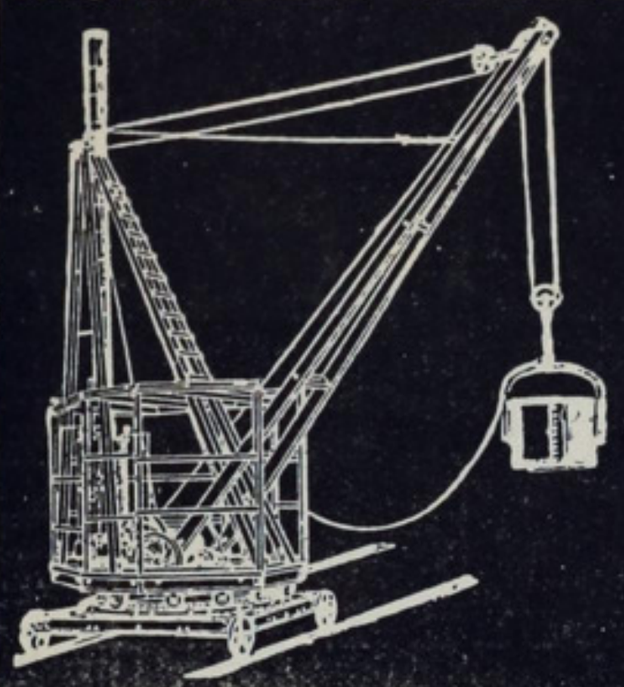

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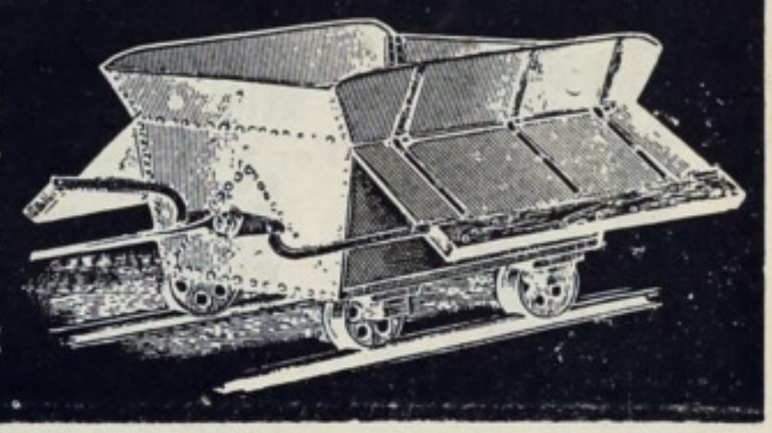

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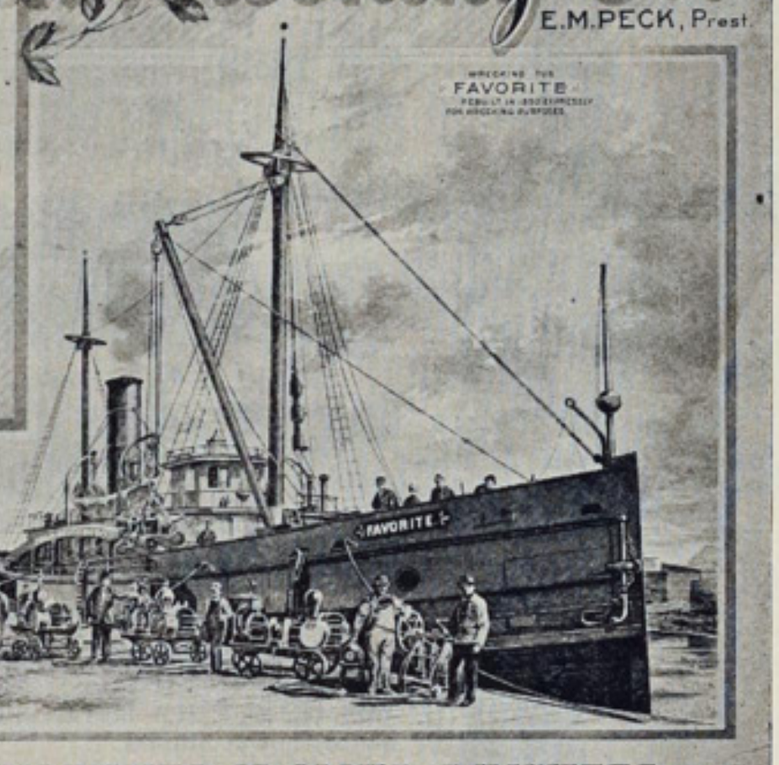

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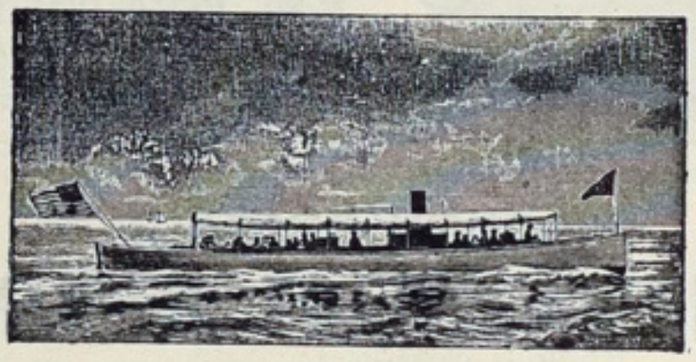

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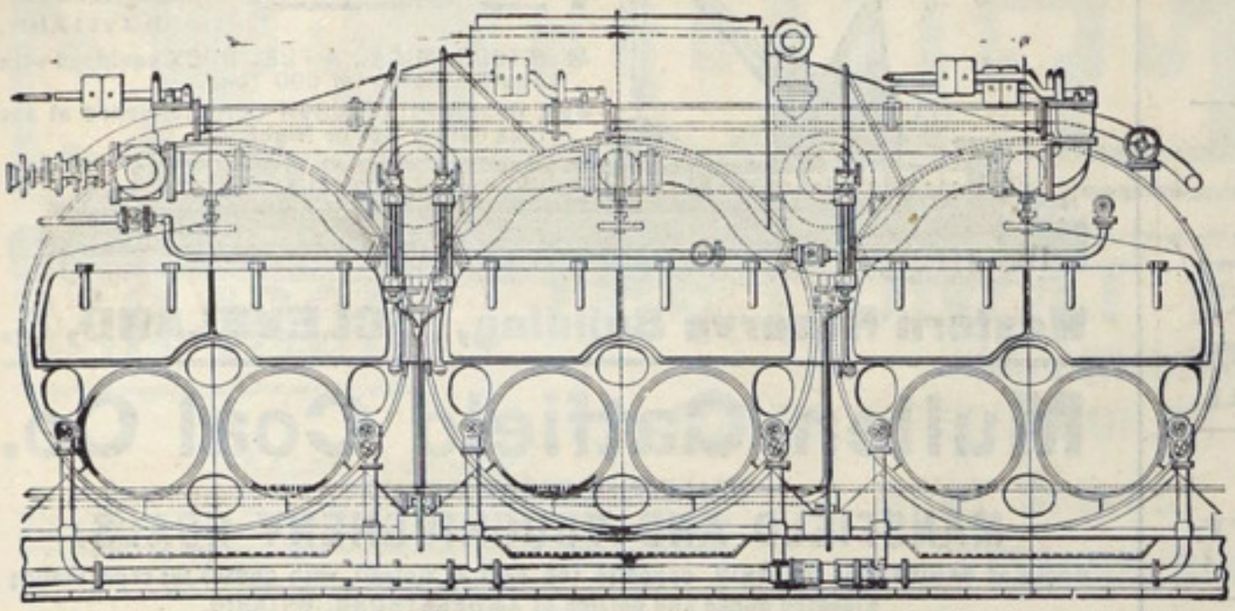

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		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet*	
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Buffalo, N. Y.	....do	341	349	45	.....	14	Timber.
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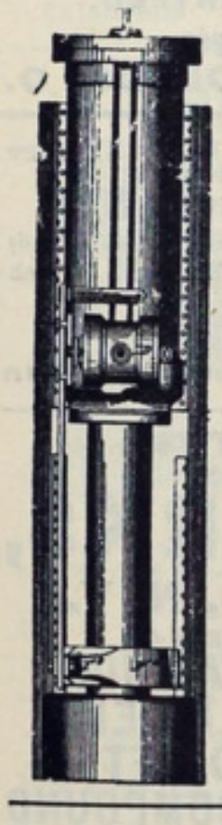

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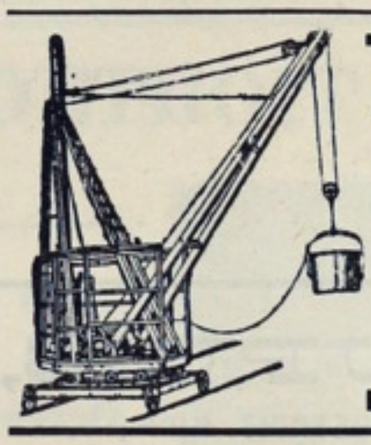

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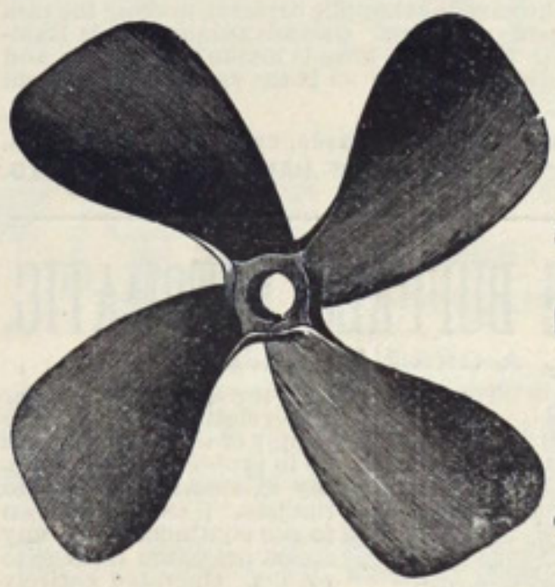

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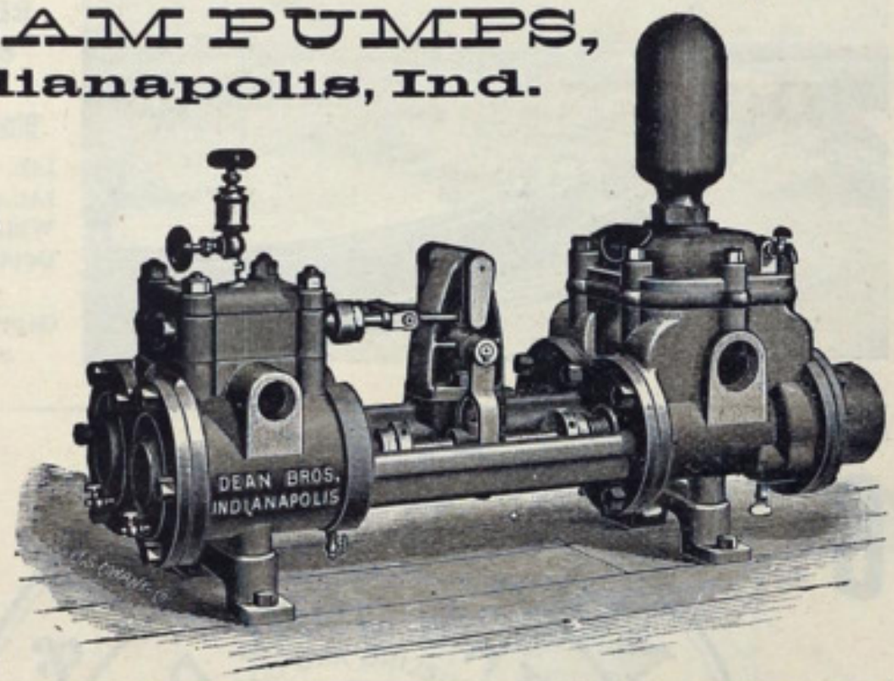

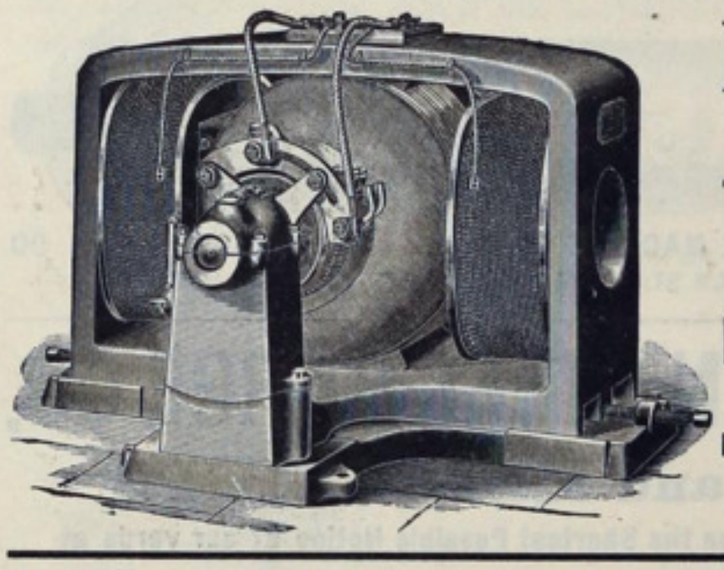

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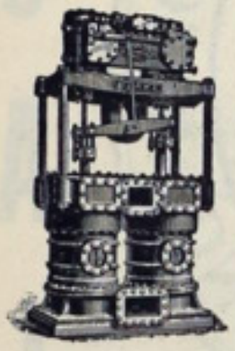

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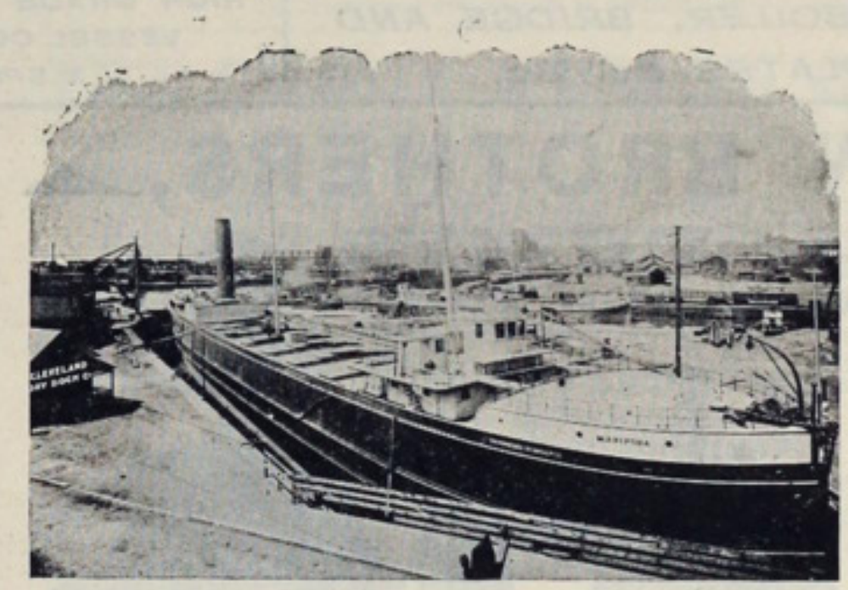

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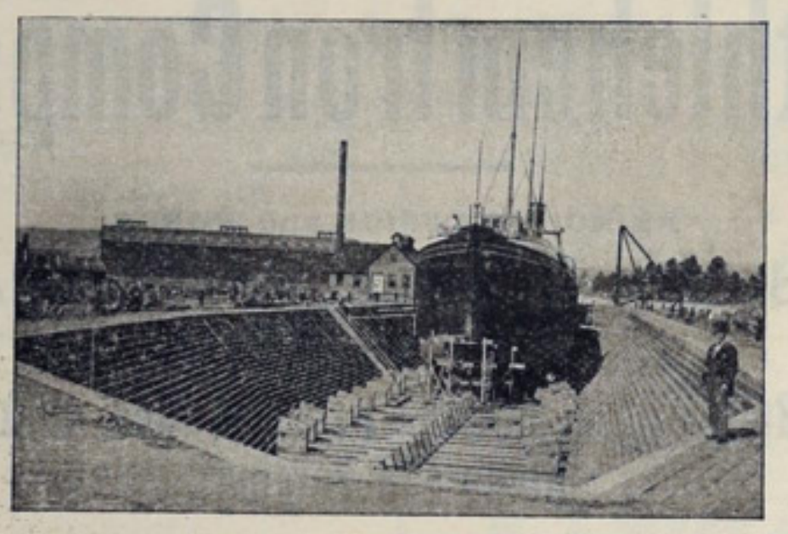

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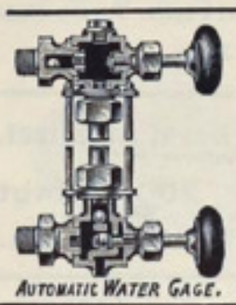

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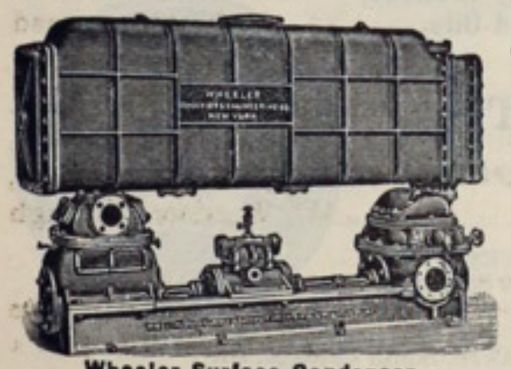

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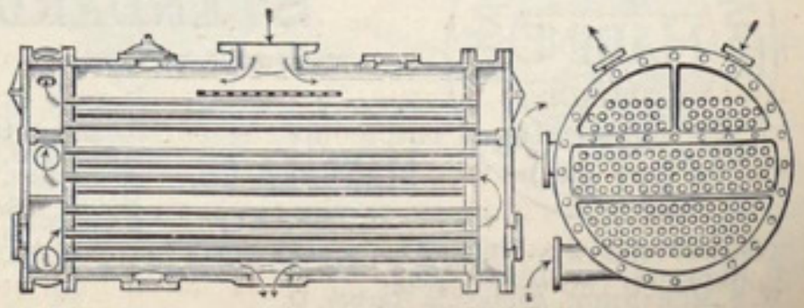

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